

The Coloured Cluster about α Crucis. By W. C. Russell, Esq.

The following Catalogue of Stars, and the map have been made for the purpose of ascertaining whether, as asserted, any remarkable change has taken place in the relative positions and colours of the stars since they were laid down by Sir J. Herschel at the Cape.

Of thirty-three stars, the differences in R.A. and Dec. were obtained with the position-micrometer, each difference in R.A. given in the notes is the mean of two observations, and in some cases the mean of several. The differences in declination are single measures.

The instrument used is a refractor, by Merz, $7\frac{1}{4}$ -inches clear aperture, 10 feet 4 inches focus, with powers from 80 to 400. The colours were examined with a "Browning-With" reflector, of $8\frac{1}{2}$ -inches, and found the same as given with the refractor.

Observations were begun on 25 March, 1872, but the majority of the measures (126 in R.A., and 63 in Dec.) were made on the night of 26th of March, which was a fine, clear night, with a black sky and the stars very steady; the stars (33) then measured were all that were visible of the cluster in full moonlight. From the positions thus determined the stars were laid down on a map of the same scale as the map herewith; as great change in No. 11 was indicated, 14 observations of R.A. were taken, giving a mean of $12^{\text{h}} 5^{\text{m}} 3^{\text{s}}$, the extremes being $12^{\text{h}} 5^{\text{m}} 0^{\text{s}}$ and $12^{\text{h}} 5^{\text{m}} 6^{\text{s}}$.

On the 3rd of April, about 170 stars were entered on the map, by eye, assisted with the micrometer lines and the stars previously measured, the following night several additional stars were entered, and colour noted in Nos. 72, 78, and 80, all red, and 82 blue.

April 12, stars were clearly defined on a black sky and the whole cluster presented a beautiful appearance.

ζ was noted greenish white.

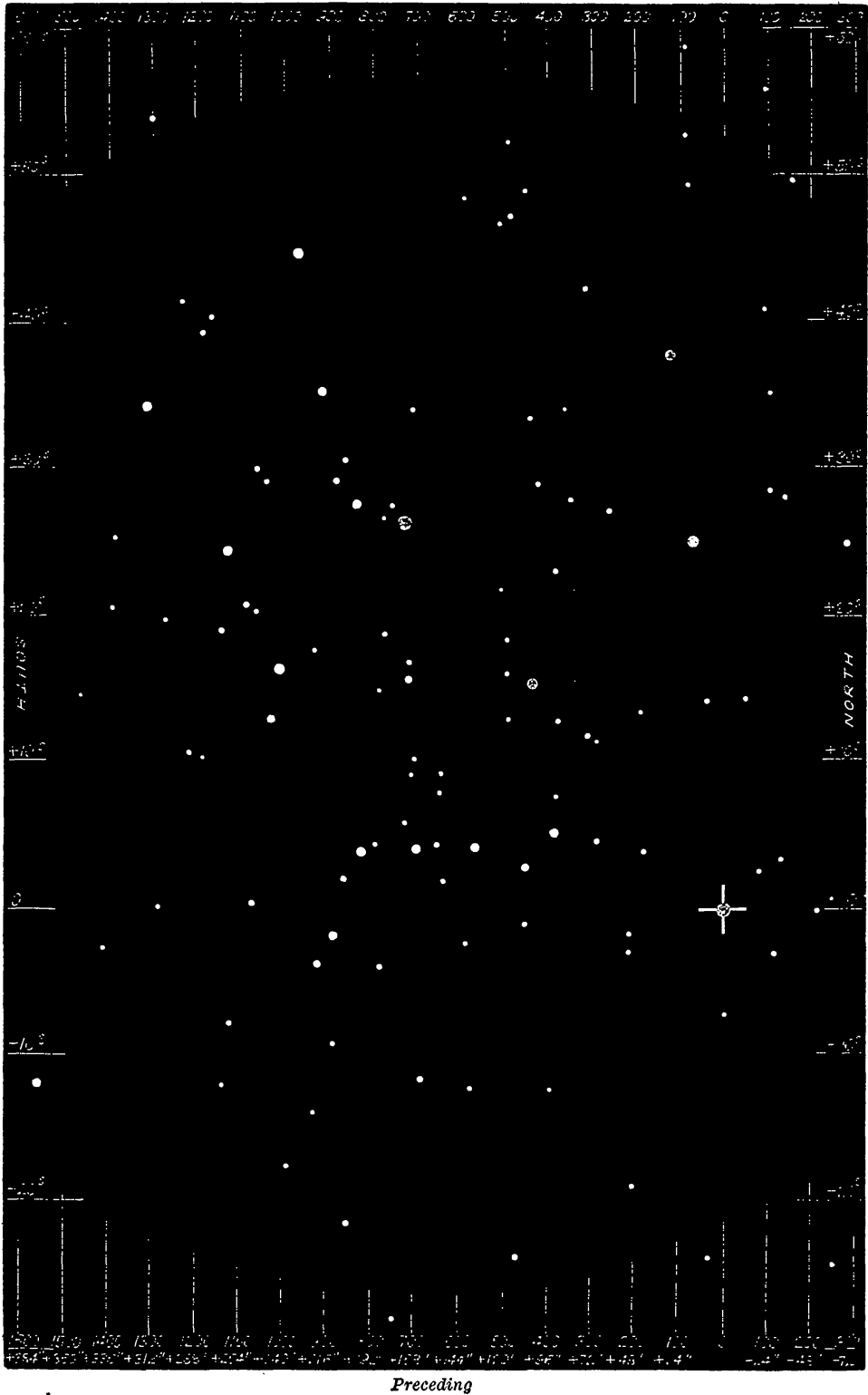
ϵ red.

ϕ blue.

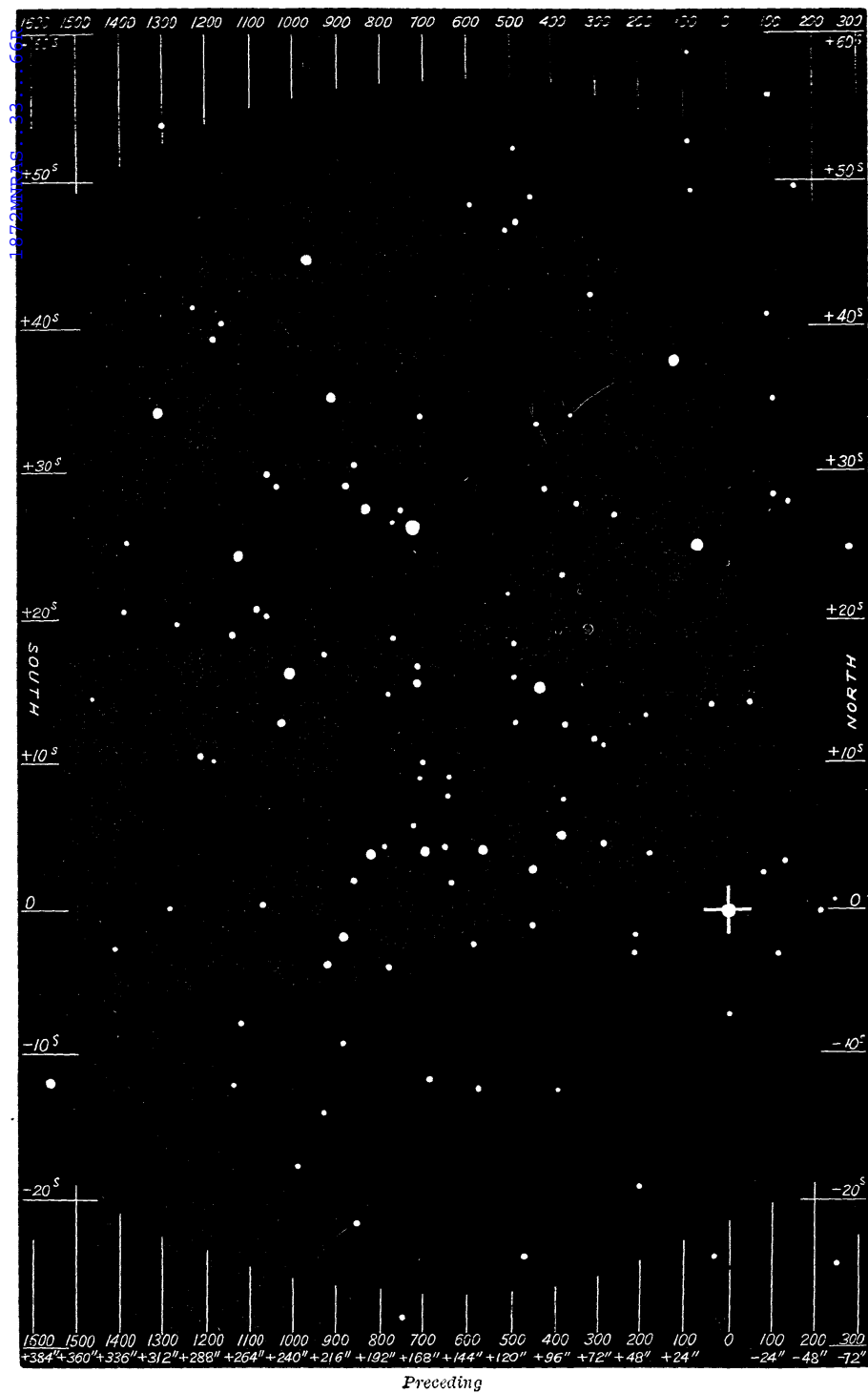
α , β , γ , and δ yellow with tinge of green. These colours were verified on many occasions for all the stars except ζ , which is usually seen the same colour as α , β , γ , and δ .

δ , ϕ , and ϵ , are nearly in a straight line, when the micrometer line is made to bisect δ and ϵ ; ϕ is on one side of it, and is not therefore more than its own diameter from the line joining δ and ϵ , and since the positions of these two stars are almost identical with H.'s, ϕ must have moved.

On the 12th, also, the positions of all the stars in the map were very carefully examined and corrected where necessary. Special care was bestowed on those that differ from H.'s map. [Several of the stars have evidently drifted. Notably three stars where lines $+50^{\circ}$ and $+120^{\circ}$ intersect (two small stars appear here which are not in H.'s map). Also Nos. 1, 5, 8, 9, 10, 11, 12, 14, 15, 21, 28, 57, 58, 94, 100, 107, and 109, with some others.



THE COLOURED CLUSTER ABOUT K CRUCIS.



THE COLOURED CLUSTER ABOUT κ CRUCIS.

Five stars in H.'s list I could not see, of these 1 was 16th magnitude, 3 of the 15th, and 1 of the 13th, but I saw 25 which are not in his list, and which I think considering the difference in the instruments used, must have appeared since, especially Nos. 16, 19, 31, 69, 79, and 120, which are all in places which have evidently been examined by H.

May 13, estimated the magnitudes of all stars on the map and entered four new ones.

May 14, added nine stars to map, which now contained all the stars I have been able to see within the limits of the map.

As soon as the original map was thus completed, a catalogue of all the stars on it was made; by measuring the position of each with a scale made for the purpose, and substituting of course, in the case of the principal stars, the micrometer results. In this way the magnitudes of the stars are made easy of reference and the positions compared with those of H. determined in a similar way. The proofs of the map were pulled with the white lines extending across, and the positions of all the stars carefully compared with the original; as the white lines interfered with the beauty of the object they were all removed except such portions as remain to indicate their places, and if measures are required it is easy to continue the requisite lines with pencil and rule.

On comparing this with H.'s map it will be seen that the north and south points are reversed, an error having crept in H.'s map in this particular, probably the fault of the engraver, as both the objects on Plate I. of *Cape Observations* are affected by the same error, and H., at p. 15, says of Messier, 8, the first object, "Three pretty distinct streaks," "arched together at their northern extremities," these are south in the map, and, again, at p. 102, star A or No. 71, is said to be "south of the red star;" i.e., No. 71 Σ , yet in the drawing it is to the north.

R.'s No.	H.'s No. and Letter.	Mag.	Secs. before α .	Secs. of Dec. + S. — N. of α .	Notes and Remarks.
			s	"	
1	1 π	10	27.8	+ 178.3	Mic. measures, 27 ^s .9 27 ^s .7 178 ["] .1, 178 ["] .5
2		12	24.8	— 60	Not in H.
3		11	24.5	+ 112	" "
4		12	24.3	+ 10	" "
5	2	11	21.3	+ 204.1	Mic. meas. 21 ^s .3 204 ["] .1
6		11	19.0	+ 48	Not in H.
7		15	18.0	+ 240	" "
8	6	15	14.5	+ 224	
9	4	12	12.8	+ 94	{ H. records a star No. 5 near this, which I did not see
10	3	13	12.2	+ 138	
11	11 κ	10 $\frac{1}{2}$	12.3	+ 376	{ Mean of 14 measures in R.A. and 5 in Dec. showing since H. a change of 6.3 and 9" in Dec. both increased
12	8	12	12.0	+ 272	

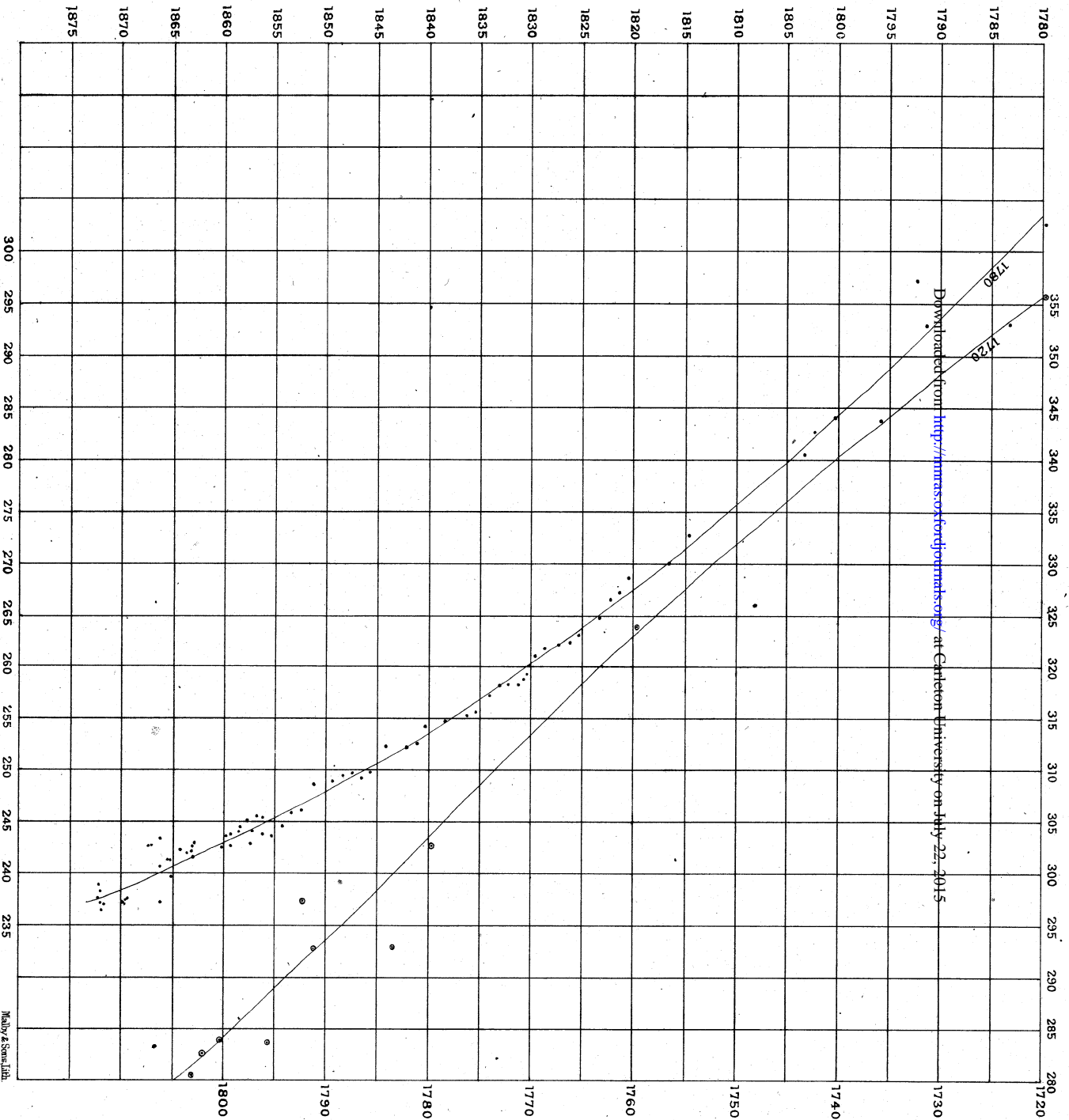
R.'s No.	H.'s No. and Letter.	Mag.	Secs. before α .	Secs. of Dec. + S. — N. of α .	Notes and Remarks.
13	7	10 $\frac{1}{2}$	12 $\frac{0}{5}$	+ 163 $\frac{1}{1}$	Mic. meas. 12 $\frac{0}{0}$ 163 $\frac{1}{1}$
14	9	14	9 $\frac{4}{4}$	+ 214	
15	12	12	8 $\frac{0}{0}$	+ 270	
16		13	7 $\frac{5}{5}$	— 4	Not in H.
17	14	12	4 $\frac{0}{0}$	+ 224	
18	10	13	4 $\frac{0}{0}$	+ 184	
19		13	3 $\frac{0}{0}$	— 30	Not in H.
20	13	14	2 $\frac{9}{9}$	+ 52	
21	28	12	2 $\frac{8}{8}$	+ 340	
22	16	13	2 $\frac{7}{7}$	+ 142	
23	17 μ	10	1 $\frac{7}{7}$	+ 212 $\frac{4}{4}$	Mic. meas. 2 $\frac{0}{0}$, 1 $\frac{8}{8}$ 4, 212 $\frac{4}{4}$, 212 $\frac{4}{4}$ 3
24	15	14	2 $\frac{0}{0}$	+ 52	
25	18	13	1 $\frac{0}{0}$	+ 108	
26	21	12	0 $\frac{3}{3}$	+ 52	
27	20 α	6 $\frac{1}{2}$			Yellow, with tinge of green
28	35	12	{ After α 0 $\frac{1}{1}$ }	+ 308	
29	19	11	0 $\frac{2}{2}$	+ 256	{ H. records two stars here, I could only see one
30	22	14	2 $\frac{0}{0}$	+ 206	
31		13	2 $\frac{2}{2}$	+ 152	Not in H.
32	24	12	2 $\frac{3}{3}$	— 22	
33	25	10 $\frac{1}{2}$	2 $\frac{8}{8}$	+ 108 $\frac{4}{4}$	Mic. meas. 2 $\frac{8}{8}$, 106 $\frac{6}{6}$, 110 $\frac{1}{1}$
34	31	12	3 $\frac{0}{0}$	— 28	
35	27 ν	10 $\frac{1}{2}$	3 $\frac{5}{5}$	+ 196 $\frac{6}{6}$	Mic. meas. 3 $\frac{5}{5}$ 7, 3 $\frac{3}{3}$ 3, 196 $\frac{6}{6}$ 8, 196 $\frac{6}{6}$ 4
36	32	10 $\frac{1}{2}$	3 $\frac{7}{7}$	+ 136 $\frac{3}{3}$	„ „ 3 $\frac{5}{5}$ 9, 3 $\frac{3}{3}$ 4, 135 $\frac{2}{2}$, 137 $\frac{4}{4}$
37	26	10	3 $\frac{8}{8}$	+ 164 $\frac{7}{7}$	„ „ 3 $\frac{5}{5}$ 8, 164 $\frac{7}{7}$
38	29	13	4 $\frac{1}{1}$	+ 44	
39	30	12	4 $\frac{3}{3}$	+ 156	
40	34	13	4 $\frac{3}{3}$	+ 191	
41	33	11	4 $\frac{8}{8}$	+ 66 $\frac{2}{2}$	Mic. meas. 4 $\frac{8}{8}$, 66 $\frac{2}{2}$
42	37	13	5 $\frac{3}{3}$	+ 90	
43	36	12	5 $\frac{7}{7}$	+ 176	
44	38	12	7 $\frac{9}{9}$	+ 90	
45	39	13	8 $\frac{3}{3}$	+ 153	
46	41	13	9 $\frac{2}{2}$	+ 168	
47	40	13	9 $\frac{3}{3}$	+ 155	
48	42	13	9 $\frac{8}{8}$	+ 172	
49	44	11	10 $\frac{5}{5}$	+ 282	
50	43	10	11 $\frac{0}{0}$	+ 291	
51	45	14	11 $\frac{7}{7}$	+ 70	
52	46 ω	11	12 $\frac{1}{1}$	+ 74 $\frac{1}{1}$	Mic. meas. 11 $\frac{8}{8}$, 12 $\frac{3}{3}$, 72 $\frac{1}{1}$, 76 $\frac{1}{1}$
53	47	12	12 $\frac{4}{4}$	+ 88	

R.'s No.	H.'s No. and Letter.	Mag.	Secs. before α .	Secs. of Dec. + S. — N. of α .	Notes and Remarks.
54	49	12	12.5	+ 114	{ H. records a star No. 50 near this, but I could not see it
55	48 ξ	9 $\frac{1}{2}$	12.8	+ 243.5	Mic. meas. 13".6, 12".6, 244".2, 242".7
56	51	13	13.4	+ 44	
57	53	13	14.1	+ 10	
58	57	13	14.2	— 10	
59	54	11	14.8	+ 190	
60		11	14.8	+ 350	Not in H.
61	52 δ	7 $\frac{1}{2}$	15.0	+ 103	{ Mic. meas. 15".1, 14".9, 103".7, 102".9, yellow, with tinge of green
62	55	12	15.3	+ 118	
63	58	10 $\frac{1}{2}$	15.3	+ 176.6	Mic. meas. 15".3 15".3, 176".2 177".0
64	59 σ	9 $\frac{1}{2}$	16.4	+ 241.0	" " 16".3 16".4, 240".5 241".4
65	61	11	16.7	+ 174	
66	56 ϕ	8 $\frac{1}{2}$	17.0	+ 90.2	{ Mic. meas. 17".0 16".9, 90".1 90".2, two observations make this star blue, one between blue and green
67	60	11	17.4	+ 224	
68	62	12	17.5	+ 120	
69		11	19.0	+ 274	Not in H.
70	65	11	19.0	+ 185	
71	63 ϵ	8	19.1	+ 75.8	{ Mic. meas. 19".0 19".2, 76".2 75".3, all observations make this star red
72	64 α	12	19.2	+ 92	Red
73		12	19.8	+ 304	Not in H.
74	67	13	20.3	+ 252	
75	68	13	20.5	+ 258	
76		12	20.5	+ 334	Not in H.
77	70	9 $\frac{1}{2}$	21.2	+ 168.2	Mic. meas. 21".0 21".3, 168".3 168".0, blue
78	66	12	21.1	+ 70	Red
79		14	21.7	+ 121	Not in H.
80	69	12	21.7	+ 80	Red
81	71	13	22.7	+ 89	
82	74	11	23.8	+ 2	Blue
83	73 ν^1	9 $\frac{1}{2}$	23.8	+ 156.9	Mic. meas. 23".9 23".6, 156".6 157".1, blue
84	72 η	8 $\frac{1}{2}$	23.9	+ 270.8	" " 24".2 23".5, 271".0 270".3
85	75 ν^2	9 $\frac{1}{2}$	24.2	+ 158.0	" " 24".5 23".9, 157".5 153".4, blue
86		12	24.7	+ 335	Not in H.
87	76 ι	9	24.7	— 68.2	Mic. meas. 25".0 24".4, 69".0 67".3
88	77 ζ	7 $\frac{1}{2}$	24.9	+ 13.6	{ " " 24".9 24".9, 14".5 12".6, green, with yellow tinge
89	78	9 $\frac{1}{2}$	25.6	+ 132.7	Mic. meas. 25".3 25".8, 131".4 134".0, blue
90	80 β	7	26.3	+ 172.7	{ " " 26".3 mean of 6 observations, 172".7 mean of 3 observations, yellow tinge green
91	79	13	26.5	+ 183	
92	81	13	26.6	+ 62	

R.'s No.	H.'s No. and Letter.	Mag.	Secs. before α .	Secs. of Dec. \div S. — N. of α .	Notes and Remarks.
93	85	13	27.4	+ 83	
94	82 θ	8 $\frac{1}{2}$	26.8	+ 201.3	{ Mic. meas. 26 $^{\circ}$.7 26 $^{\circ}$.9, 26 $^{\circ}$.8 26 $^{\circ}$.9, 201 $^{\circ}$.4 200 $^{\circ}$.5, 199 $^{\circ}$.8 199 $^{\circ}$.6
95	83	13	27.3	+ 182	
96	86	15	27.4	— 34	
97	88	15	28.0	— 26	
98	91	14	28.7	+ 101	{ H. records a star, No. 89, near this, which I did not see
99	84	13	28.7	+ 251	
100	90	9 $\frac{1}{2}$	29.1	+ 215.7	{ Mic. meas. 29 $^{\circ}$.3 28 $^{\circ}$.9 29 $^{\circ}$.2 28 $^{\circ}$.8, 215 $^{\circ}$.1 215 $^{\circ}$.5 216 $^{\circ}$.2 215 $^{\circ}$.8
101	92	9 $\frac{1}{2}$	29.2	+ 138.4	Mic. meas. 29 $^{\circ}$.1 29 $^{\circ}$.3, 138 $^{\circ}$.6 138 $^{\circ}$.1, blue
102	93	9 $\frac{1}{2}$	29.2	+ 154.7	„ „ 29 $^{\circ}$.2 155 $^{\circ}$.5 154 $^{\circ}$.3, blue
103	95	9 $\frac{1}{2}$	29.6	+ 167.5	„ „ 29 $^{\circ}$.4 29 $^{\circ}$.7, 166 $^{\circ}$.3 166 $^{\circ}$.6, blue
104	87	13	29.8	+ 254	
105	94	9 $\frac{1}{2}$	30.4	+ 110.1	Mic. meas. 30 $^{\circ}$.5 30 $^{\circ}$.3, 109 $^{\circ}$.5 110 $^{\circ}$.7, blue
106	96	13	30.6	+ 208	
107	97	12	33.1	+ 106	
108	99	14	33.7	+ 170	{ H. has another star near this, which I could not see
109	98	12	34.1	+ 89	
110		14	34.3	— 25	Not in H.
111	100 ϵ	8 $\frac{1}{2}$	34.6	+ 316.2	Mic. meas. 34 $^{\circ}$.3 34 $^{\circ}$.8, 316 $^{\circ}$.3 316 $^{\circ}$.1
112	101 χ	9 $\frac{1}{2}$	35.6	+ 220.3	„ „ 35 $^{\circ}$.3 35 $^{\circ}$.8, 219 $^{\circ}$.8 220 $^{\circ}$.9
113	102 γ	7	37.4	+ 26.1	{ „ „ 37 $^{\circ}$.2 37 $^{\circ}$.5, 25 $^{\circ}$.6 26 $^{\circ}$.6 yellow tinge, green
114	104	14	38.5	+ 277	
115	105	14	40.5	+ 273	
116		14	40.7	— 22	Not in H.
117		14	41.6	+ 78	„ „
118	106	14	42.0	+ 296	
119	107 σ	9 $\frac{1}{2}$	43.8	+ 233	Secs. after a rest on one obs. by mic.
120		15	46.4	+ 123	Not in H.
121	108	11	46.7	— 119	
122	109	12	48.0	+ 144	
123		14	49.0	+ 20	Not in H.
124		15	49.0	+ 108	„ „
125		14	49.3	— 34	„ „
126	110 τ	11	52.0	+ 118	
127		14	52.7	+ 22	Not in H.
128		12	53.4	+ 312	„ „
129		14	55.2	— 23	„ „
130		14	58.5	+ 22	„ „

The paper is accompanied by the following letter to the Secretary of the Royal Astronomical Society:—

CASTOR.- INTERPOLATING CHART.



I send herewith the result of some recent observations on the small coloured cluster about α *Crucis*. Many of the stars have drifted considerably since the Cape drawing was made, and of the stars included in that drawing, there are five small ones that I could not see ; but the most remarkable fact is, that using a 7 $\frac{1}{4}$ in. refractor I have detected twenty-five stars not recorded, and therefore, I think there can be no doubt, *not seen* by Sir John Herschel with his large reflector ; and if in a small space like this twenty-five new stars may appear in so short a time, it is evident that more attention should be bestowed on clusters. The colours in this cluster are very beautiful, and fully justify Herschel's remark that it looks like a "superb piece of fancy jewellery."

I do not know whether the results sent are suitable for publication by the R. A. Society, but I have sent them for that purpose.

I also send my Annual Report for 1871.

*The Observatory,
Sydney, New South Wales.*

*Note to accompany the Chart showing the relative position
of the two stars in Castor. By J. M. Wilson, Esq.*

The chart embraces a period of 160 years, from A.D. 1720 to A.D. 1880. The right hand curve has reference to the dates on the right side of the chart, and the left hand curve to the dates on the left of the chart. A change of angle is shown from 355° to 235°, the degrees marked at the top having reference to the upper or right-hand curve, and those at the bottom to the lower or left-hand curve. Part of the curve is repeated to show the continuity of curvature. The dots enclosed in small circles belong to the right-hand curve, the others to the left. Every observation made use of is included in the annexed list, which was furnished me by Mr. Gledhill, of Halifax.

Table I.

Date.	θ	Observer.	Date.	θ	Observer.
1719.84	355.88	B and P	1825.24	263.30	S
1759.80	323.78	B and M	1826.22	262.54	Σ
1779.85	302.78	H	1827.28	262.52	Σ
1783.64	293.05	..	1828.67	261.87	H
1791.15	292.95	..	1829.88	260.97	H
1792.16	297.27	..	1830.52	259.02	H
1795.95	283.88	..	1830.95	258.80	Sm
1800.27	284.32	..	1831.22	258.32	Da
1802.08	282.77	..	1832.12	258.42	Da
1803.19	280.55	..	1833.15	258.10	Da
1814.83	272.87	Σ	1834.08	257.23	Da
1816.97	270.00	H	1835.33	255.48	Σ
1820.34	268.99	Σ	1836.31	255.20	Sm
1821.21	267.12	H and S	1838.21	254.90	Da
1822.01	266.81	Σ	1840.20	254.13	Da
1823.11	264.98	H and S	1841.11	252.82	M